JURNAL AGROEKOTEKNOLOGI TERAPAN
Applied Agroecotechnology Journal

Agroteknologi Universitas Sam Ratulangi e ISSN:2797-0647

The Effect of Rice Washing Water Concentration and Growing Media Composition on the Growth and Yield of Tomato Plants (*Solanum lycopersicum* L.).

Daniel Carlos Pinondang Sinaga, Julio Eiffelt Rossaffelt Rumbiak, Putra Utama, Dewi Firnia.

Department of Agroecotechnology, Faculty of Agriculture, Sultan Ageng Tirtayasa University, Serang, Banten, Indonesia

*Corresponding author:
dnielsinaga26@gmail.com

Manuscript received: 23 Feb 2026.
Revision accepted: 22 Apr 2026.

Abstract. Tomato (*Solanum lycopersicum* L.) production in Banten has significantly declined due to land constraints and suboptimal cultivation practices, necessitating sustainable alternatives like fermented rice wash water (RWW) and optimal planting media. This study aimed to determine the most effective combination of RWW concentration and growing media composition to enhance tomato growth and yield in polybag cultivation. The research was conducted from November 2025 to March 2026 at Universitas Sultan Ageng Tirtayasa, Banten, using a factorial Randomized Complete Block Design. Factors included RWW concentrations (0, 50, 100, and 150 mL/L) and four media compositions (soil, soil+manure, soil+husk charcoal, and soil+manure+husk charcoal). The results showed that the soil-only medium (B0) produced the best vegetative performance, particularly for plant height and stem diameter. Specifically, the interaction of 100 mL/L RWW and soil (S2B0) yielded the highest plant height of 35.60 cm at 4 weeks after transplanting. Furthermore, a significant interaction was observed in the generative phase, with 50 mL/L RWW combined with soil and rice husk charcoal (S1B2) achieving the highest productivity, yielding 158.00 g fruit weight and 11.33 fruits per plant. These findings suggest that integrating 50 mL/L RWW with porous media is the most effective strategy for optimizing tomato yield.

Keywords: *Fruit weight, planting media, rice wash water, Solanum lycopersicum L., vegetative growth*

INTRODUCTION

Tomatoes (*Solanum lycopersicum L.*) are a high-value horticultural commodity essential for national food security due to their rich nutritional profile, including vital vitamins, minerals, and antioxidants (Saloko *et al.*, 2019). While domestic demand steadily increases alongside population growth, national production fluctuates, forcing a continued reliance on imports (BPS, 2024). This challenge is particularly acute in Banten Province, where tomato production plummeted from 1,190.1 tons in 2021 to just 614.7 tons in 2023. Constraints on agricultural land primarily drive this significant decline, driven by urbanization and suboptimal cultivation practices, including inefficient fertilization and poor selection of planting media (Kalsumy & Nihayati, 2018).

To address land limitations and improve crop yield, polybag cultivation offers a highly efficient alternative for urban and restricted areas. However, its success depends heavily on precise nutrient management and the selection of optimal planting media (Sarjiyah & Istiyanti, 2020). Liquid Organic Fertilizer (LOF) derived from fermented rice washwater offers a sustainable, cost-effective, and nutrient-rich solution. Abundant in essential vitamins (B1, B3, B6) and microelements, rice wash water processed with EM4 and molasses has been shown to significantly enhance tomato growth and fruit weight when applied at optimal concentrations (Hasalsyah *et al*., 2024; Sari & Alfianita, 2019).

Furthermore, maximizing LOF efficacy requires a planting medium with excellent aeration, water retention, and organic fertility. Using agricultural waste, such as a 1:1:1 combination of soil, manure, and carbonized rice hulls, is highly effective in supporting nutrient absorption and root development in polybag systems (Damanik & Setyoni, 2021; Wales *et al*., 2023).

Therefore, this study aims to determine the optimal combination of fermented rice wash water concentration (as LOF) and planting media composition to maximize the vegetative growth and productivity of tomato plants in polybag cultivation.

RESEARCH METHODOLOGY

This research was conducted from November 2025 to February 2026 at the Rooftop Greenhouse of the Agroecology Laboratory, Faculty of Agriculture, Sultan Ageng Tirtayasa University, Serang, Banten. The materials utilized included tomato seeds (Servo F1 variety), rice wash water, EM4 solution, palm sugar, topsoil, cow manure, and rice husk charcoal.

The study employed a Randomized Complete Block Design (RCBD) with two factors and three replications, yielding a total of 48 experimental units. The first factor was the concentration of rice wash water (S), comprising four levels: S0 (control/water only), S1 (50 mL/L), S2 (100 mL/L), and S3 (150 mL/L). The second factor was the composition of the growing media (B), comprising four levels: B0 (soil), B1 (soil + cow manure at 1:1), B2 (soil + rice husk charcoal at 1:1), and B3 (soil + cow manure + rice husk charcoal at 1:1:1).

Observational data were processed using an Analysis of Variance (ANOVA). If the ANOVA indicated a significant or highly significant effect, further statistical separation of means was conducted using Duncan's Multiple Range Test (DMRT) at a 5% significance level.

RESULTS AND DISCUSSION

Plant Height

Plant height is a primary indicator of vegetative growth, reflecting the continuous activity of cell division and elongation. The vegetative phase is critical in determining plant productivity because growth energy is prioritized for the development of fundamental structures, including roots, stems, and leaves (Kurniawati, 2022).

Table 1. Average plant height (cm) due to the effect of rice wash water and growing media composition

Plant Age	Rice Wash (S)	Growing Media (B)				Average
		b0	b1	b2	b3	
2 WAT	s0	12,67	10,17	10,00	10,50	10,83
	s1	11,50	8,33	10,67	9,67	10,04
	s2	13,33	8,83	10,33	9,67	10,54
	s3	11,50	9,17	10,33	8,83	9,96
Average		12,25a	9,12b	10,33b	9,67b	10,34
3 WAT	s0	23,33	12,83	15,50	17,33	17,25
	s1	22,67	12,83	17,50	13,67	16,67
	s2	20,50	13,83	17,50	21,67	18,38
	s3	21,00	16,50	15,17	11,50	16,04
Average		21,88a	14,00b	16,42b	16,04b	17,08
4 WAT	s0	35ab	17cd	20,5cd	26,67ab	24,79
	s1	34,83ab	17,5cd	33ab	25,5ab	27,71
	s2	35,60a	20,17cd	27,17ab	32,83ab	28,94
	s3	27,17ab	26ab	22,83bc	12,33d	22,08
Average		33,15	20,17	25,88	24,33	25,88
5 WAT	s0	49,67	21,67	26,00	40,33	34,42
	s1	41,00	18,33	52,00	37,33	37,17
	s2	50,67	31,00	39,33	41,33	40,58
	s3	34,67	36,67	30,67	15,67	29,42
Average		44,00a	26,92b	37ab	33,67ab	35,40

Note: Numbers followed by the same lowercase letter indicate a non-significant difference based on the 5% DMRT

Statistical analysis indicated that the interaction between RWW concentration and growing media significantly influenced plant height, particularly at 4 weeks after transplanting (WAT). The S2B0 treatment (100 mL/L RWW in soil medium) produced the highest plant height of 35.60 cm at 4 WAT and continued to show superior growth, reaching 50.67 cm at 5 WAT. This suggests that a 100 mL/L concentration provides an optimal nutrient threshold that synergizes with the soil medium to facilitate vertical growth.

The effectiveness of the S2 treatment is attributed to the balanced supply of essential macronutrients Nitrogen (N), Phosphorus (P), and Potassium (K) inherent in rice wash water. Nitrogen is fundamental for tissue formation and stem elongation, while Phosphorus supports energy metabolism and root development. As noted by Cutriani *et al*. (2023), RWW application enhances growth by improving root system architecture, thereby increasing nutrient absorption efficiency.

Furthermore, the control medium (B0) consistently outperformed mixed media (B1, B2, B3) in vertical growth. This trend suggests that the soil-only medium maintained more stable physical and chemical conditions. In contrast, media with high organic amendments often undergo microbial decomposition, which may temporarily sequester nutrients for microbial use before they become available to the plant. A stable soil structure ensures balanced aeration and water-holding capacity, supporting optimal root penetration and nutrient uptake (Posundu & Ramli, 2024). Conversely, the S3B3 treatment recorded the lowest height (12.33 cm at 4 WAT), indicating that high concentrations of RWW combined with complex media may lead to suboptimal conditions, likely due to incomplete organic matter decomposition or nutrient imbalances.

Stem Diameter

Observations of stem diameter were conducted at 2 WAT, 4 WAT, and 6 WAT. The stem base reflects cell division and enlargement activities influenced by nutrient availability and growth hormones from the LOF.

Table 2. Average stem diameter (mm) due to the effect of rice wash water and growing media composition

Plant Age	Rice Wash (S)	Growing Media (B)				Average
		b0	b1	b2	b3	
2 WAT	s0	3,70	3,07	3,00	3,57	3,33
	s1	4,20	2,90	3,50	2,97	3,39
	s2	3,77	2,63	3,37	3,40	3,29
	s3	3,37	3,13	3,03	2,70	3,06
Average		3,76a	2,93b	3,23b	3,16b	3,27
3 WAT	s0	4,17a	3,20 cd	3,33bc	3,83ab	3,63
	s1	4,30a	3,10cd	4,03ab	3,30bc	3,68
	s2	4,03ab	2,80d	3,67ab	3,77ab	3,57
	s3	3,57ab	3,73ab	3,67ab	3,10cd	3,52
Average		4,02a	3,20c	3,68ab	3,50bc	3,60
4 WAT	s0	4,57ab	3,53c	3,47c	4,27ab	3,96
	s1	4,87a	3,20c	4,47ab	3,43c	3,99
	s2	4,33ab	3,40c	3,90bc	4,17ab	3,95
	s3	3,73bc	3,90bc	3,93bc	3,03c	3,65
Average		4,38a	3,51b	3,94b	3,73b	3,89
5 WAT	s0	5,60a	4,30b	4,07b	4,80ab	4,69
	s1	5,13ab	3,43c	4,87ab	3,80bc	4,31
	s2	4,83ab	3,63c	4,17b	4,50ab	4,28
	s3	4,03b	4,27b	4,27b	3,23c	3,95
Average		4,90	3,91	4,34	4,08	4,31

Note: Numbers followed by the same lowercase letter indicate a non-significant difference based on the 5% DMRT.

Based on Table 6, the application of rice wash water (RWW) combined with specific growing media compositions significantly influenced tomato plant stem diameter, particularly at 4 Weeks After Transplanting (WAT). The combination of 50 ml/L RWW and soil medium (S1B0) produced the largest stem diameter at 4.87 mm. This value represents the treatment group with the most favorable stem growth response. While the 5% DMRT (Duncan's Multiple Range Test) indicated that S1B0 was not significantly different from S0B0 or S1B2, it numerically outperformed most other treatments. In contrast, the smallest diameter was recorded in the S3B3 treatment (3.03 mm), indicating relatively inhibited growth.

The 50 ml/L concentration in the S1 treatment is suggested to be the optimal threshold for providing essential nutrients without inducing nutritional imbalances in the growing medium. Rice wash water contains vital macronutrients, including nitrogen (N), phosphorus (P), and potassium (K), which facilitate vegetative growth, specifically in the formation of stem and leaf tissues. At appropriate concentrations, these nutrients are utilized more efficiently by the plant, thereby enhancing radial growth (Windi *et al.*, 2021).

The superior growth observed in the B0 (control) medium is attributed to its more stable physical, chemical, and biological conditions compared to those in mixed media. Soil media without excessive organic amendments typically maintain a more balanced structure regarding aeration, porosity, and water-holding capacity, thereby supporting optimal root development. Robust root systems increase the plant's efficiency in absorbing water and nutrients (Posundu & Ramli, 2024). Consequently, the synergy of adequate nutrient availability in S1 and the supportive physical properties of B0 resulted in enhanced stem diameter.

Stem diameter is a growth parameter that increases more slowly than plant height or leaf count. Santoso *et al*. (2020) noted that height and leaf development are driven by primary growth in the apical meristem through rapid cell elongation. Conversely, stem diameter is determined by secondary growth, which involves cambial activity that forms woody tissue and thickens the stem through a more complex, gradual process of cell division and differentiation. Significant changes in stem diameter often require longer observation periods, as secondary tissues form incrementally (Hidayati & Prasetyo, 2021).

Fruit Weight

Fruit weight per plant is a critical yield indicator reflecting the plant's capacity to accumulate and allocate photosynthates to generative organs. The average fruit weight per tomato plant (*Solanum lycopersicum* L.) under varying treatments is presented in Table 3.

Table 3. Average fruit weight per plant (g) due to the effect of rice wash water and growing media composition.

Rice Wash (S)	Growing Media (B)				Average
	b0	b1	b2	b3	
	gram				
s0	139,67ab	44,00cd	79,33bc	17,00cd	70,00
s1	76,00bc	2,67e	158,00a	42,67cd	69,83
s2	68,67bc	89,33bc	81,33bc	76,00bc	78,83
s3	17,00cd	57,33cd	45,33cd	10,67de	32,58
Average	75,33	48,33	91,00	36,58	62,81

Note: Numbers followed by the same lowercase letter indicate a non-significant difference based on the 5% DMRT.

Table 3. shows a significant interaction between treatments for fruit weight. The S1B2 treatment produced the highest fruit weight of 158.00 g, which was significantly higher than most other combinations. The success of S1B2 is attributed to the porous structure of the rice husk charcoal in the B2 medium, which enhances aeration, drainage, and moisture retention. These physical properties allow the root system to optimize water and nutrient absorption, thereby maximizing photosynthesis and allocating photosynthate to the fruit. This is consistent with Sitinjak and Mulyadi (2021) and Fadhillah and Harahap (2020), who reported that rice husk charcoal increases tomato production and fruit weight.

Conversely, treatments like S1B1, S0B3, and S3B3 yielded lower fruit weights, likely due to incomplete organic matter decomposition, which limits immediate nutrient availability (Damanik & Setyorini, 2021). Additionally, environmental stressors, such as high temperatures (up to 32.5°C) inside the 4th-floor greenhouse, may have increased evapotranspiration rates, further impacting optimal fruit development (Marveldani *et al*., 2018).

Fruit Diameter

Fruit diameter serves as a vital indicator of tomato yield quality, closely related to fruit enlargement during the generative phase.

Table 4. Average fruit diameter (mm) due to the effect of rice wash water and growing media composition

Rice Wash (S)	Growing Media (B)				Average
	b0	b1	b2	b3	
	mm				
s0	30,52	32,08	32,03	17,65	28,07a
s1	29,64	11,73	27,98	16,58	21,48ab
s2	32,16	24,54	35,90	27,59	30,05a
s3	10,41	18,18	20,68	9,60	14,72b
Average	25,68	21,63	29,15	17,85	23,58

Note: Numbers followed by the same lowercase letter indicate a non-significant difference based on the 5% DMRT

The largest fruit diameter was observed in the S2B2 combination (35.90 mm), while the smallest was in S3B3 (9.60 mm). The superior performance of S2B2 suggests that the 100 ml/L concentration, combined with the rice husk charcoal medium, provided ideal conditions for fruit enlargement. Manure in the medium serves as a readily decomposing organic matter source, providing necessary nutrients (Ramdani *et al*., 2018). The soil analysis confirmed a fertile base with 5.895% organic carbon and a neutral pH of 7.0.

It is worth noting that the maximum diameter achieved (35.90 mm) remained below the genetic potential of the Servo variety (48.2-51.3 mm). This suggests that while treatments were effective, environmental variables (temperature, humidity, light intensity) and source-sink dynamics (photosynthate distribution among multiple fruits) constrained the maximum achievable size (Asnijar *et al*., 2013; Syahputra *et al*., 2017; Hapsari *et al*., 2017).

Number Of Fruits Per Plant

The average number of fruits per tomato (*Solanum lycopersicum* L.) plant in the rice-washing water treatment and growing medium composition is presented in Table 9. ANOVA results showed that the combination of rice-washing water and growing medium composition in S1B2 had the greatest effect on increasing the number of tomato fruits. In contrast, the other treatments showed no significant effect.

Table 5. Average number of fruits per plant due to the effect of rice wash water and growing media composition.

Rice Wash (S)	Growing Media (B)				Average
	b0	b1	b2	b3	
	fruits				
s0	5,67bc	2,33bc	3,33bc	2,00bc	3,33
s1	3,33bc	0,33d	11,33a	4,33bc	4,83
s2	3,33bc	5,33bc	6,00b	6,00b	5,17
s3	1,00bc	3,67bc	2,33bc	0,67cd	1,92
Average	3,33	2,92	5,75	3,25	3,81

Note: Numbers followed by the same lowercase letter indicate no significant difference based on the 5% DMRT.

The S1B2 treatment produced the highest yield, averaging 11.33 fruits per plant, demonstrating the most significant effect among all combinations. The synergy between the 50 ml/L rice wash water and the soil + husk charcoal medium created an optimal environment for generative growth. Rice wash water supplies critical P and K required for flower formation and strengthening the fruit stalk (Sulardi & Sany, 2018; Rijal & Arini, 2023). Furthermore, the organic compounds in the wash water likely stimulated beneficial microbial activity in the B2 medium, enhancing nutrient mineralization and availability (Aini *et al*., 2023).

Environmental factors also played a critical role; excessively high or humid temperatures can trigger flower drop, reducing the number of successful fruit sets (Afifi *et al*., 2017; Simamora, 2019). The structural benefits of the B2 medium likely mitigated some of these environmental stressors by maintaining consistent root hydration and aeration.

CONCLUSION AND RECOMMENDATIONS

Based on the research findings, several key conclusions can be drawn regarding the growth and yield of tomato plants. First, the application of rice washing water (RWW) at a concentration of 100 mL/L (S2) produced the optimal result for fruit diameter, with an average of 30.05 mm. Second, the control planting medium (B0) demonstrated the most favorable impact on vegetative growth, specifically for plant height at 2, 3, and 5 weeks after transplanting (WAP) with values of 12.25 cm, 21.88 cm, and 44 cm, respectively, as well as for stem diameter at 2, 3, and 4 WAP. Furthermore, a significant interaction between RWW concentration and growing media was observed. The combination of 100 mL/L RWW and control medium (S2B0) yielded the highest plant height at 4 WAP (35.60 cm). In the generative phase, the interaction of 50 mL/L RWW combined with a soil and rice husk charcoal medium (S1B2) provided the most substantial effect, achieving a maximum fruit weight of 158.00 g and a fruit count of 11.33 per plant.

Based on the aforementioned conclusions, the following recommendations are proposed for practical application and future research. To optimize fruit weight and quantity, it is highly recommended to use a planting medium composed of soil and rice husk charcoal (B2) in combination with a 50 mL/L RWW concentration. However, if the primary objective is to produce larger fruit diameters, a higher concentration of 100 mL/L RWW is suggested. Additionally, further studies should be conducted to investigate the influence of RWW application frequency (e.g., daily versus biennial intervals) and to establish a more precise pattern of nutrient uptake efficiency for tomato cultivation.

REFERENCES

Afifi, L. N., Wardiyati, T., & Koesriharti. (2017). Respon tanaman tomat (*Lycopersicum esculentum* Mill) terhadap aplikasi pupuk yang berbeda. *Jurnal Produksi Tanaman*, 5(5), 774–781. http://dx.doi.org/10.21176/protan.v5i5.419

Anata, R., Sahiri, N., & Ete, A. 2014. Pengaruh berbagai komposisi media tanam dan pupuk kandang terhadap pertumbuhan dan hasil tanaman daun dewa (*Gynura pseudochina* (L.) DC). *E-Jurnal Agrotekbis*, 2(1), 10-20.

Anggorowati, D., Roedy, S., & Ninuk, H. 2016. Respon tanaman tomat (*Lycopersicum esculentum* Mill) pada berbagai tingkat ketebalan mulsa jerami padi. *Jurnal Produksi Tanaman*, 4(5), 378-384. http://dx.doi.org/10.21176/protan.v4i5.305

Azhari, N. F., Muharam, & Rahmi, H. (2021). Pengaruh pemberian kombinasi fermentasi air cucian beras dan limbah cair tahu pada pertumbuhan dan hasil tanaman cabai rawit (*Capsicum frutescens* L.) varietas Pelita F1. *Jurnal Ilmiah Wahana Pendidikan*, 7(3), 141–150. https://doi.org/10.5281/zenodo.4764835

Ayuso-Yuste, M. C., González-Cebrino, F., Lozano Ruiz, M., Fernández-León, A. M., & Bernalte-García, M. J. 2022. Influence of ripening stage on quality parameters of five traditional tomato varieties grown under organic conditions. *Horticulturae*, 8(4), 313. https://doi.org/10.3390/horticulturae8040313

BPS (Badan Pusat Statistik). 2024. *Produksi Tanaman Hortikultura*. BPS Provinsi Banten. Serang.

Cutriani, W., Resdiar, A., Ariska, N., & Afrillah, M. (2023). Pengaruh POC dari air cucian beras dan arang sekam padi terhadap pertumbuhan tanaman sawi (*Brassica juncea* L.). *Jurnal Agrotek Lestari*, 8(2), 116–126. https://doi.org/10.35308/jal.v8i2.7176

Damanik, A. F., & Setyorini, T. (2021). Respon pertumbuhan dan hasil tanaman tomat (*Solanum lycopersicum*) varietas Fortuna pada perlakuan kombinasi pupuk tunggal dan beberapa komposisi media tanam. *Vegetalika*, 10(4), 247–258. https://doi.org/10.22146/veg.63043

Fadhillah, W., & Harahap, F. S. (2020). Pengaruh pemberian solid (tandan kosong kelapa sawit) dan arang sekam padi terhadap produksi tanaman tomat. *Jurnal Tanah dan Sumber Daya Lahan*, 7(2), 299-305. https://doi.org/10.21776/ub.jtsl.2020.007.2.14

Hasalsyah, W., Midranisiah, & Aryani, I. (2024). Pengaruh pemberian kascing dan pupuk organik cair air cucian beras terhadap pertumbuhan dan produksi tanaman tomat (*Lycopersicum esculentum* Mill.) di polybag. *Agriwana: Jurnal Pertanian dan Kehutanan*, 2(2), 25–33. https://doi.org/10.32672/agriwana.v2i2.1158

Kalsumy, U., & Nihayati, E. 2018. Pengaruh interval fertigasi dan perbedaan media tanam terhadap pertumbuhan dan hasil tomat (*Lycopersicum cerasiformae*.) dengan sistem hidroponik. *Jurnal Produksi Tanaman*, 6(11), 2903–2909. http://dx.doi.org/10.21176/protan.v6i11.954

Kusumayati, N., Nurlaelih, E. E., & Setyobudi, L. 2015. Tingkat keberhasilan pembentukan buah tiga varietas tanaman tomat (*Lycopersicon esculentum* Mill.) pada lingkungan yang berbeda. *Jurnal Produksi Tanaman*, 3(8), 683-688. http://dx.doi.org/10.21176/protan.v3i8.243

Posundu, A. S., & Ramli. 2024. Pengaruh media tanam terhadap pertumbuhan dan hasil tanaman tomat (*Solanum lycopersicum* L.). *Agrotekbis: E-Jurnal Ilmu Pertanian*, 12(2), 481-489. https://doi.org/10.22487/agrotekbis.v12i2.2125

Rijal, M. A. S., & Arini, S. 2023. Pengaruh pemberian MOL rebusan kedelai dan air cucian beras terhadap pertumbuhan dan hasil tanaman tomat (*Solanum lycopersicum* L.). *Journal Agroplant*, 7(1), 58-66. https://doi.org/10.56013/agr.v7i1.2583

Saloko, S., Handito, D., Rahayu, N., Rahman, S., & Dwiani, A. (2019). Pengolahan tomat menjadi saos tomat. *Jurnal Pendidikan dan Pengabdian Masyarakat*, 2(2), 204-208. https://doi.org/10.29303/jppm.v2i2.1121

Sihotang, D. R., Syafitri, D., Octaviana, D. C., Septianingrum, P. A., & Asy-Syfaiyyah, A. (2025). Identification of pests and diseases in tomato plants in Jeprono Village, Karangbangun District, Karanganyar Regency. *Jurnal Biologi Tropis*, 25(1), 381–393. https://doi.org/10.29303/jbt.v25i1.8229

Supriyanto, E. A., Maulana, H., & Badrudin, U. (2024). Aplikasi interval pupuk organik cair pada variasi konsentrasi yang berbeda terhadap pertumbuhan dan produksi tanaman buncis (*Phaseolus vulgaris* L.) di dataran rendah. *Biofarm: Jurnal Ilmiah Pertanian*, 20(1), 130–137. https://doi.org/10.31941/biofarm.v20i1.3857

Wales, S., Tulung, S. M. T., & Mamarimbing, R. (2023). Pertumbuhan dan produksi tanaman tomat (*Solanum lycopersicum* L.) pada beberapa jenis media tanam. *Jurnal Agroekoteknologi Terapan*, 4(1), 84-93. https://doi.org/10.35791/jat.v4i1.47291

Windi, W., Parwanayoni, N. M. S., & Astarini, I. A. (2021). Pemanfaatan limbah air cucian beras sebagai pupuk organik cair untuk meningkatkan pertumbuhan tanaman tomat (*Solanum lycopersicum* L.). *Simbiosis*, 9(2), 75–82. https://doi.org/10.24843/JSIMBIOSIS.2021.v09.i02.p03